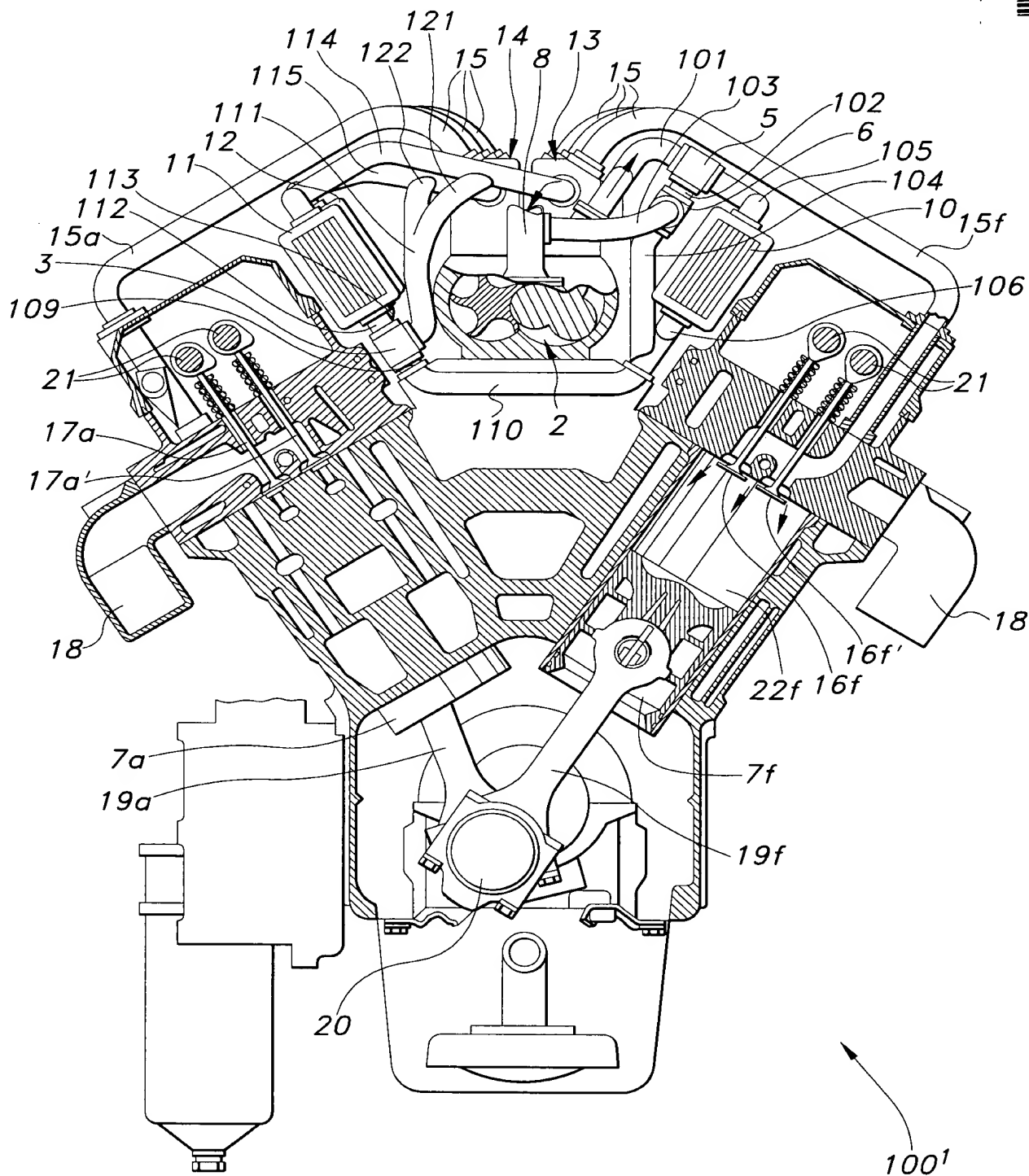


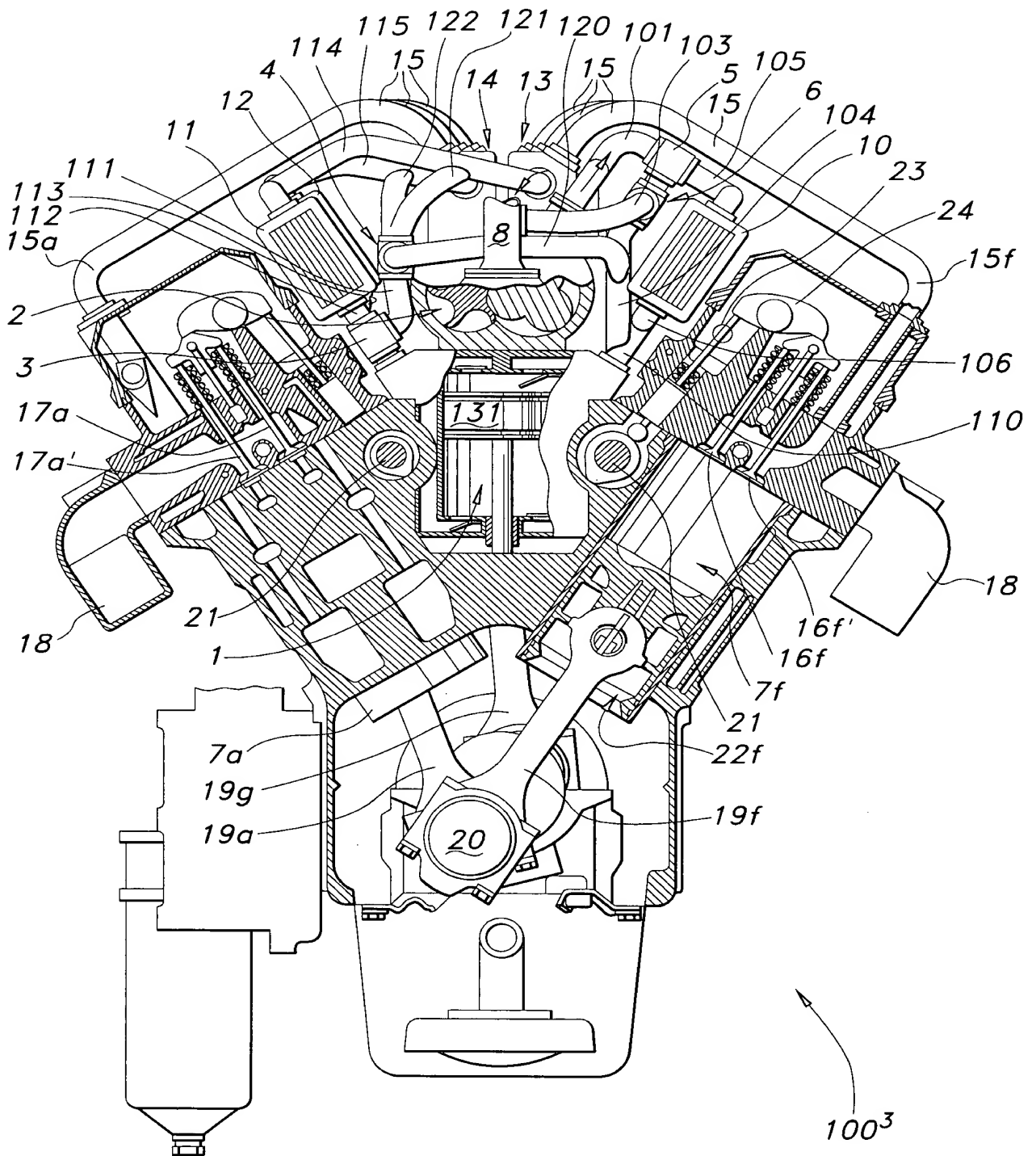
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|           |                |
|-----------|----------------|
| APPROVED  | OC FIG         |
| BY        | CLASS SUBCLASS |
| DRAFTSMAN |                |



**FIG 1**

[illegible]

**FIG 3**

|           |                |
|-----------|----------------|
| APPROVED  | O.G. FIG.      |
| BY        | CLASS SUBCLASS |
| DRAFTSMAN |                |

|           |              |
|-----------|--------------|
| O.G. FIG. |              |
| CLASS     | SUBCLASS     |
| APPROVED  | BY DRAFTSMAN |

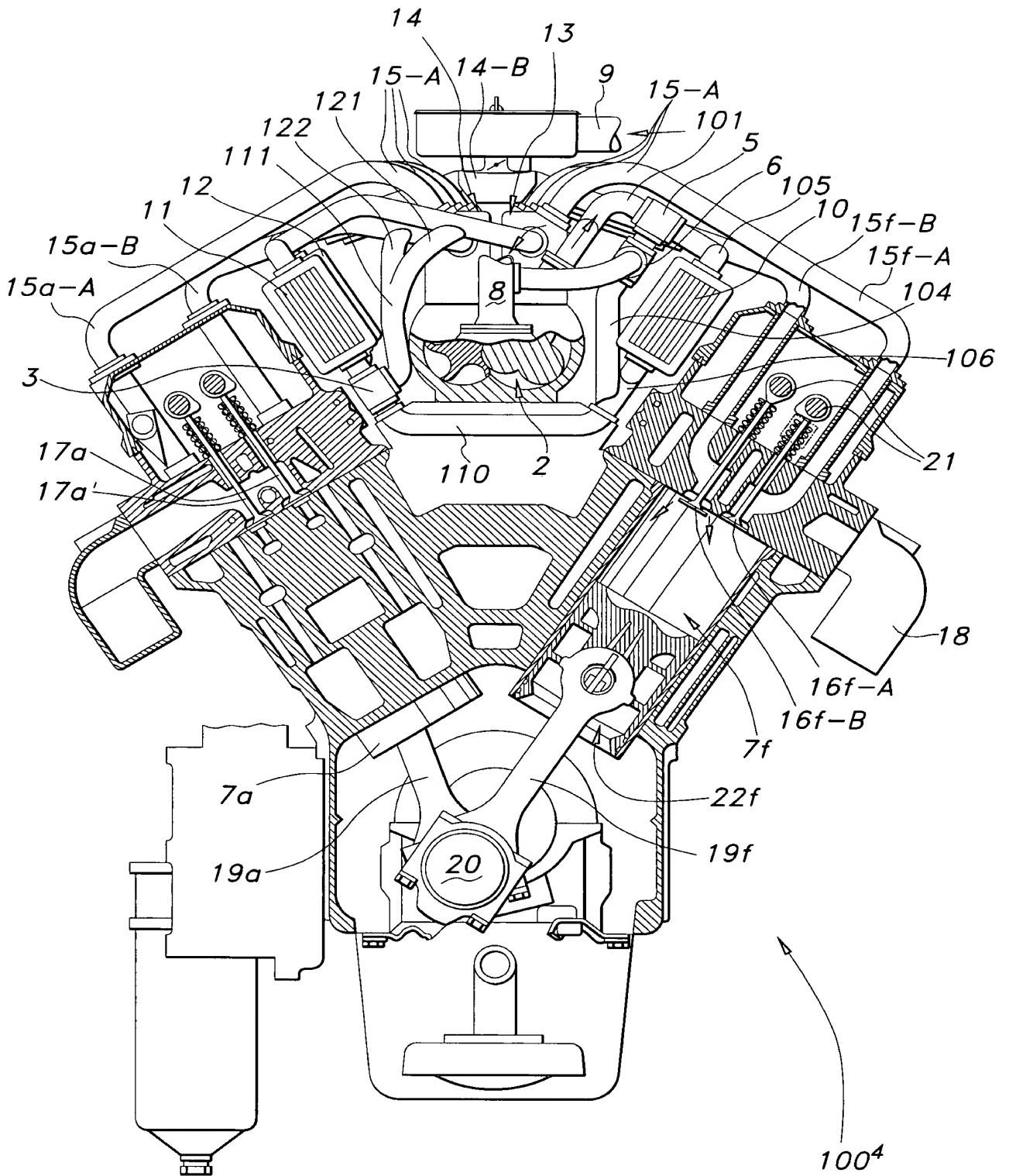


FIG 4





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|           |                |
|-----------|----------------|
| APPROVED  | O.G. FIG.      |
| BY        | CLASS SUBCLASS |
| DRAFTSMAN |                |

DATE: 11-11-83

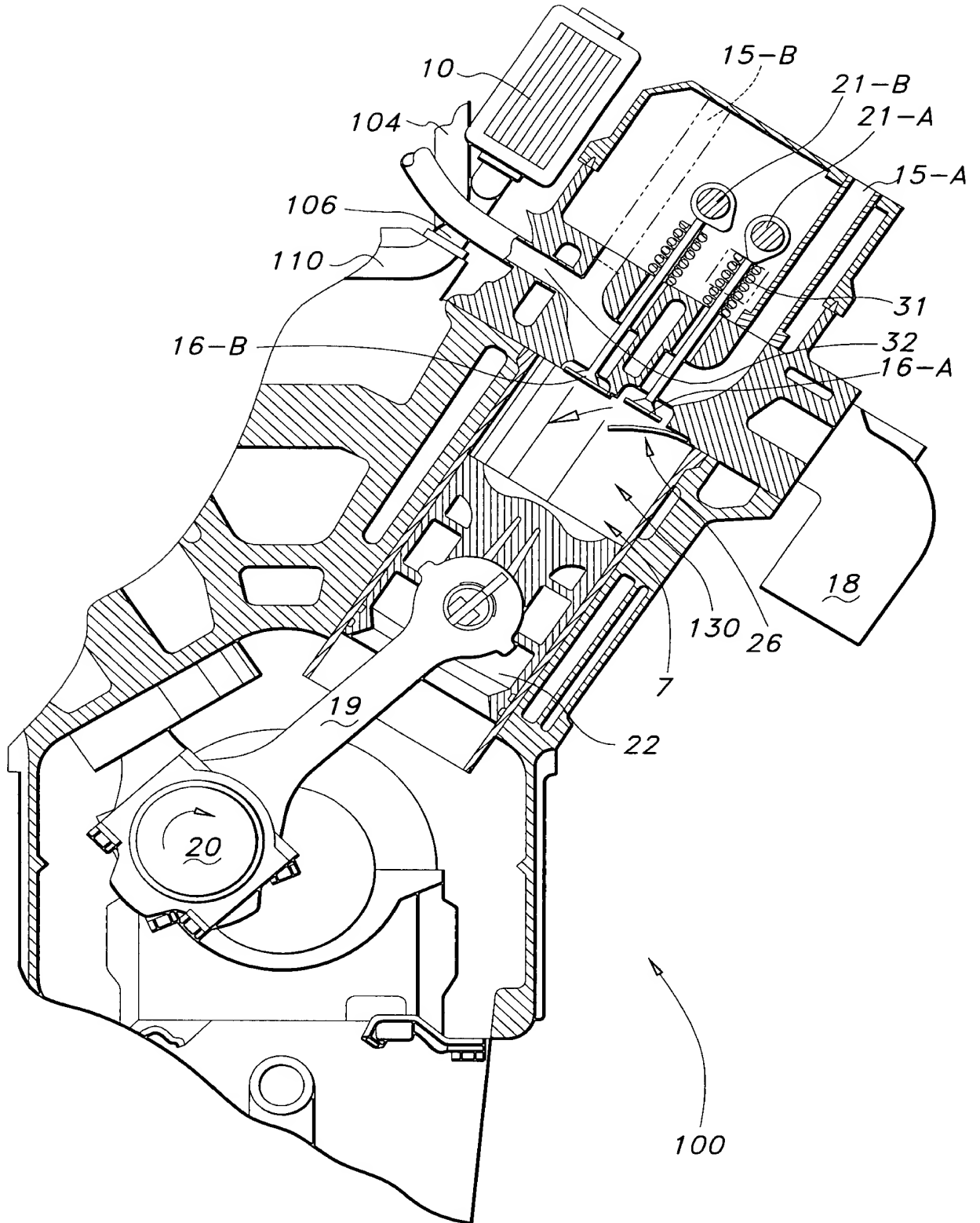
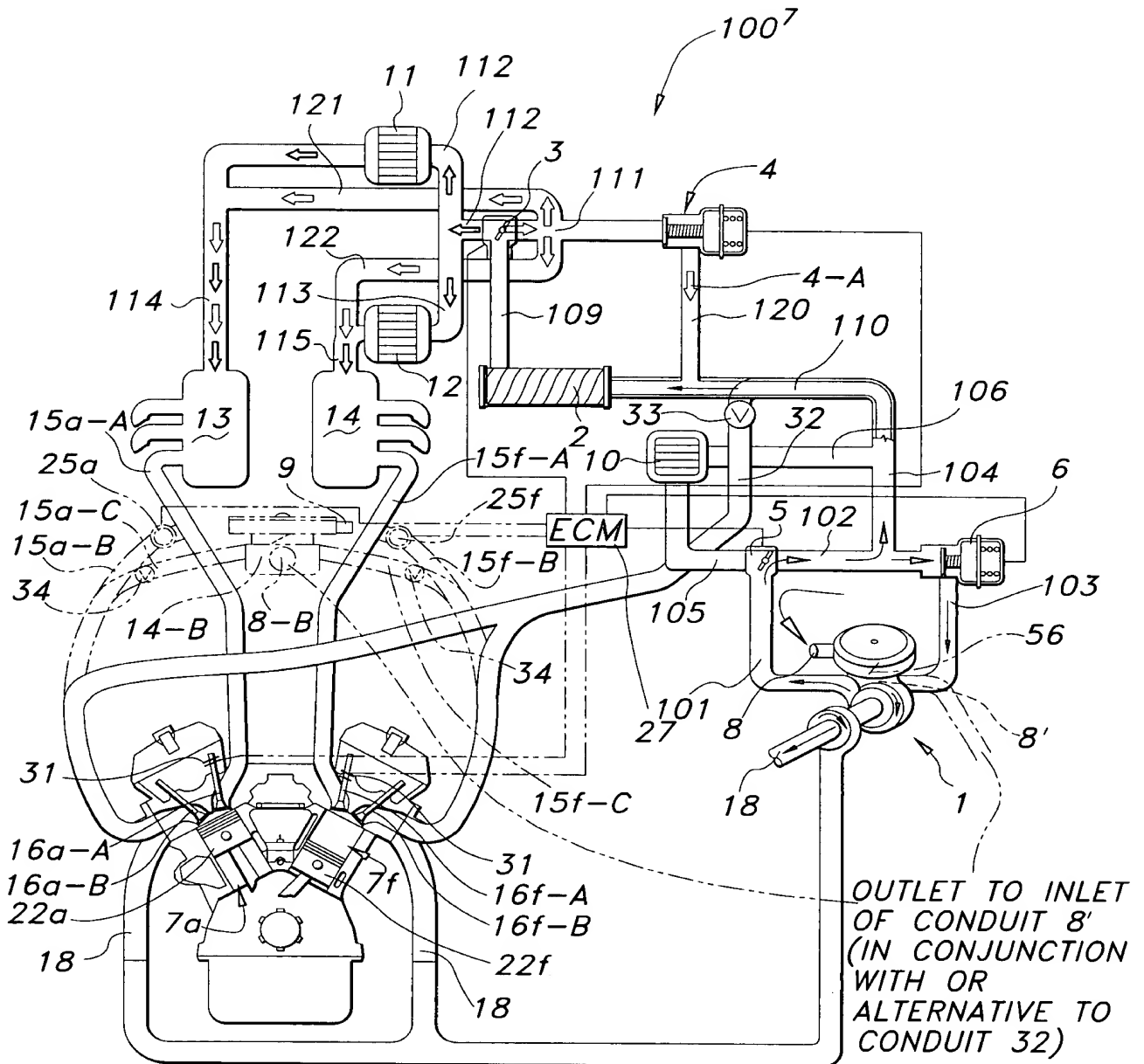


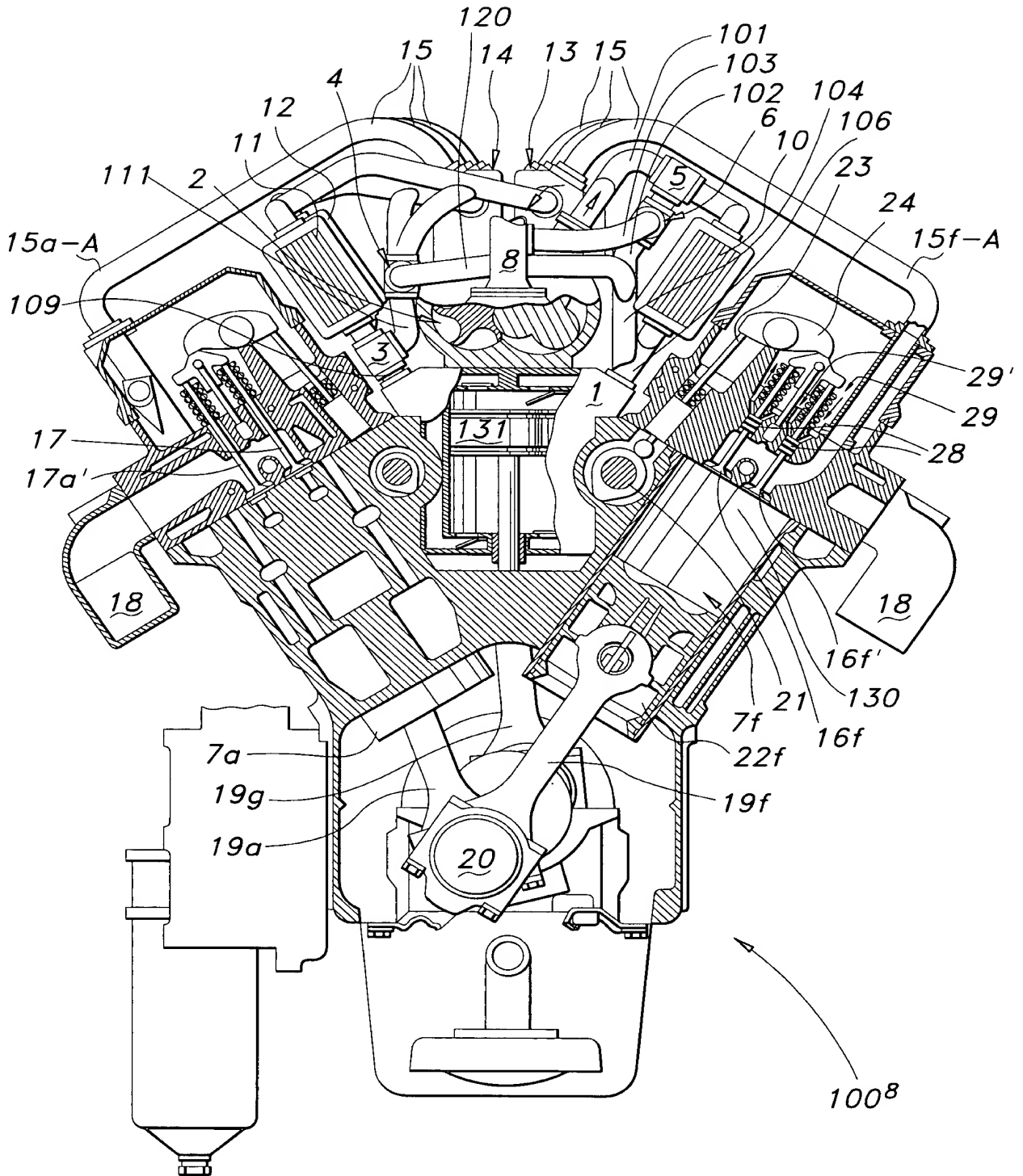
FIG 6

|           |          |       |          |
|-----------|----------|-------|----------|
| APPROVED  | O.G. FIG | CLASS | SUBCLASS |
| BY        |          |       |          |
| DRAFTSMAN |          |       |          |

**FIG 7**



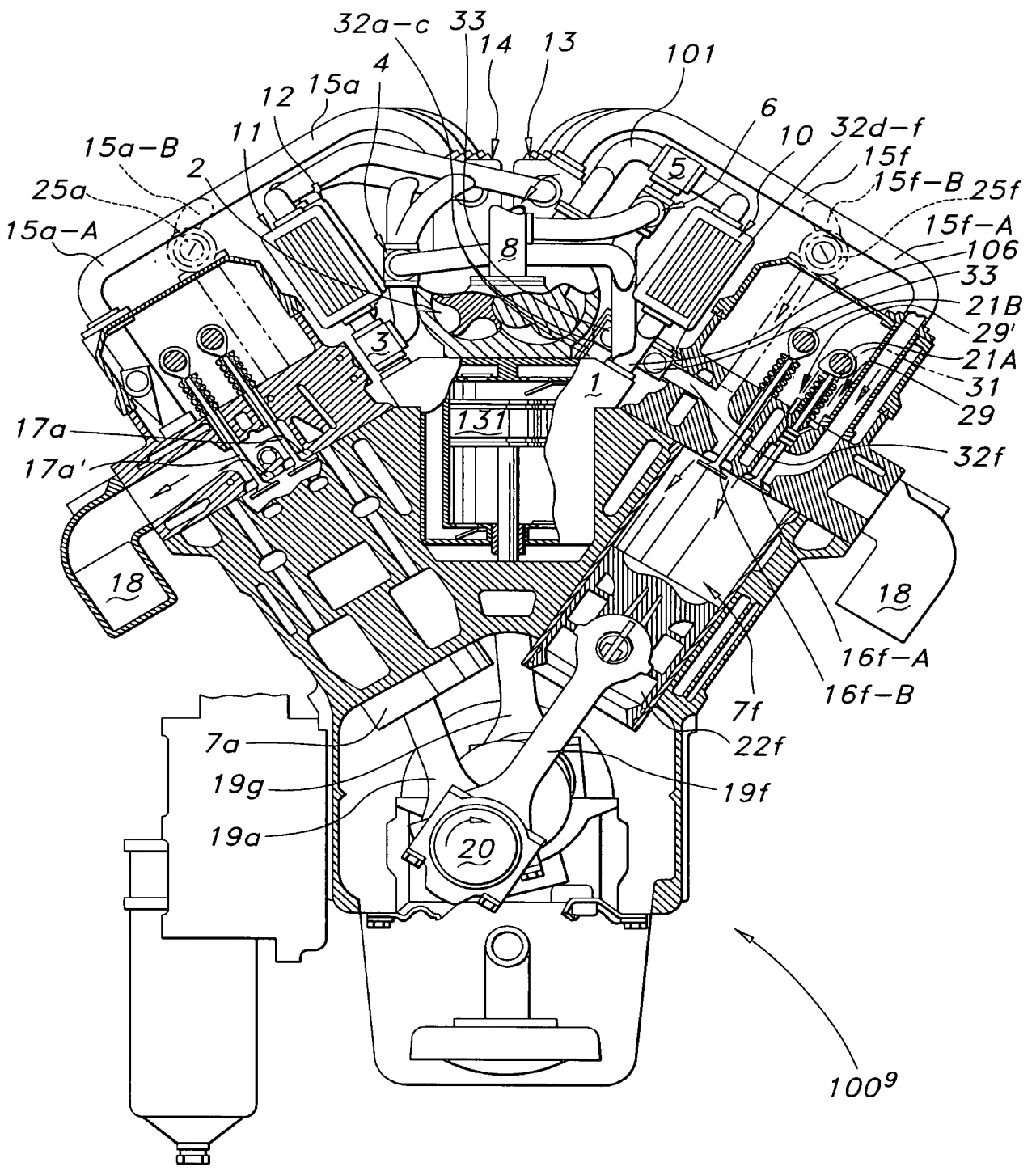
APPROVED BY DRAFTSMAN  
 O.G. FIG. CLASS SUBCLASS  
 1008



**FIG 8**

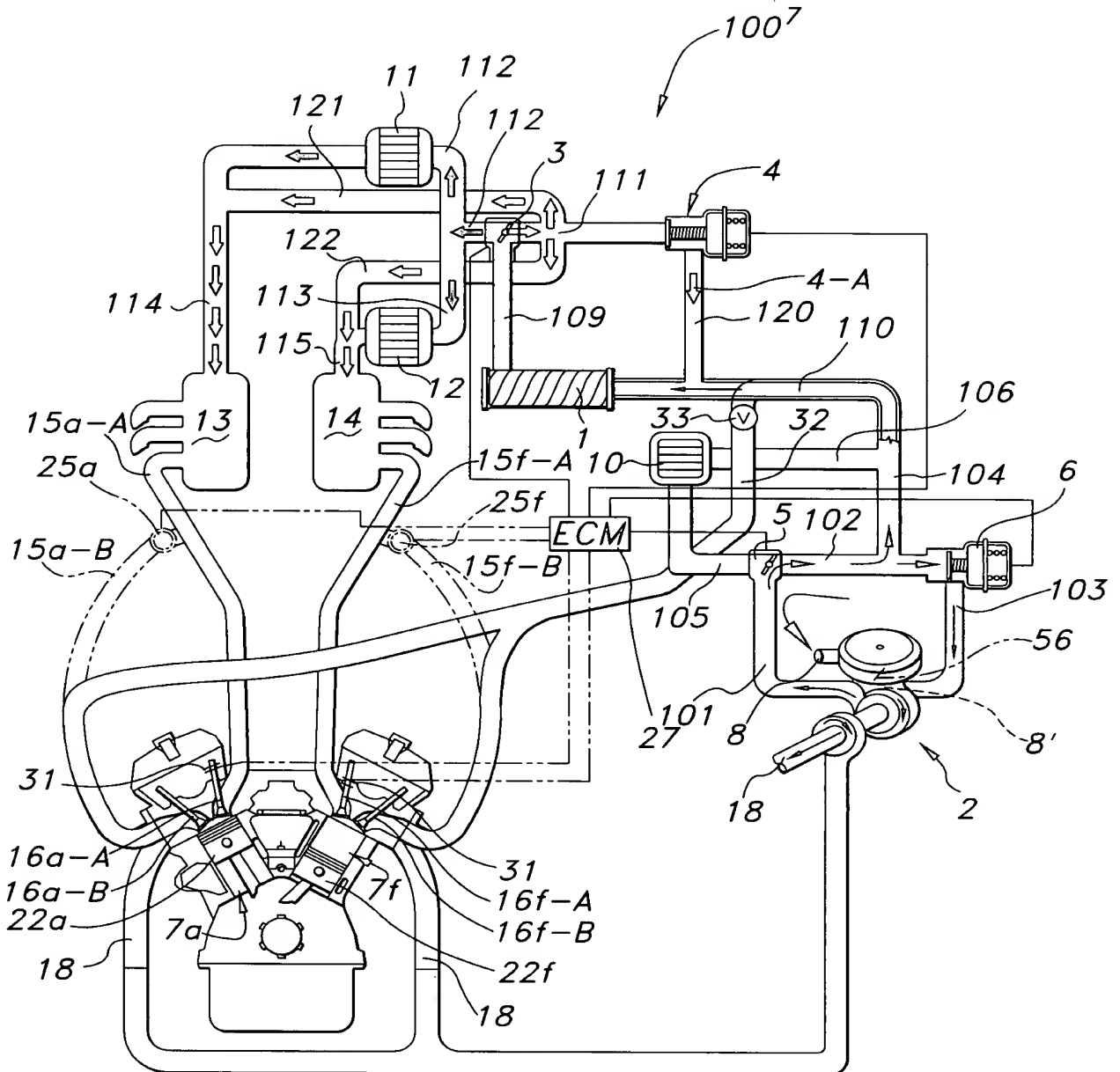
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|           |                |
|-----------|----------------|
| APPROVED  | OG FIG         |
| BY        | CLASS SUBCLASS |
| DRAFTSMAN |                |



**FIG 9**

|           |         |          |
|-----------|---------|----------|
| APPROVED  | O G FIG |          |
| BY        | CLASS   | SUBCLASS |
| DRAFTSMAN |         |          |



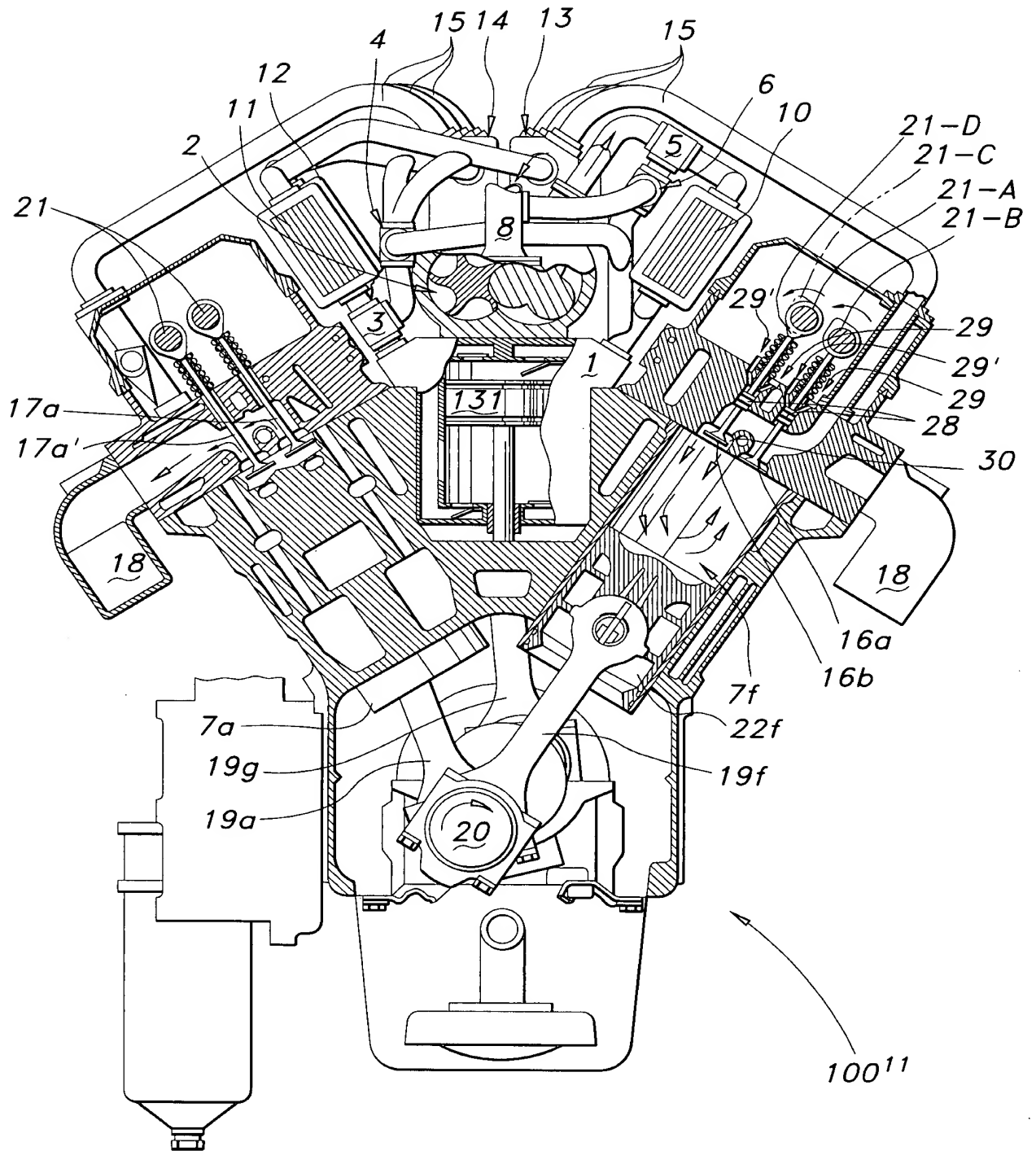
**FIG 9B**



FIG 10

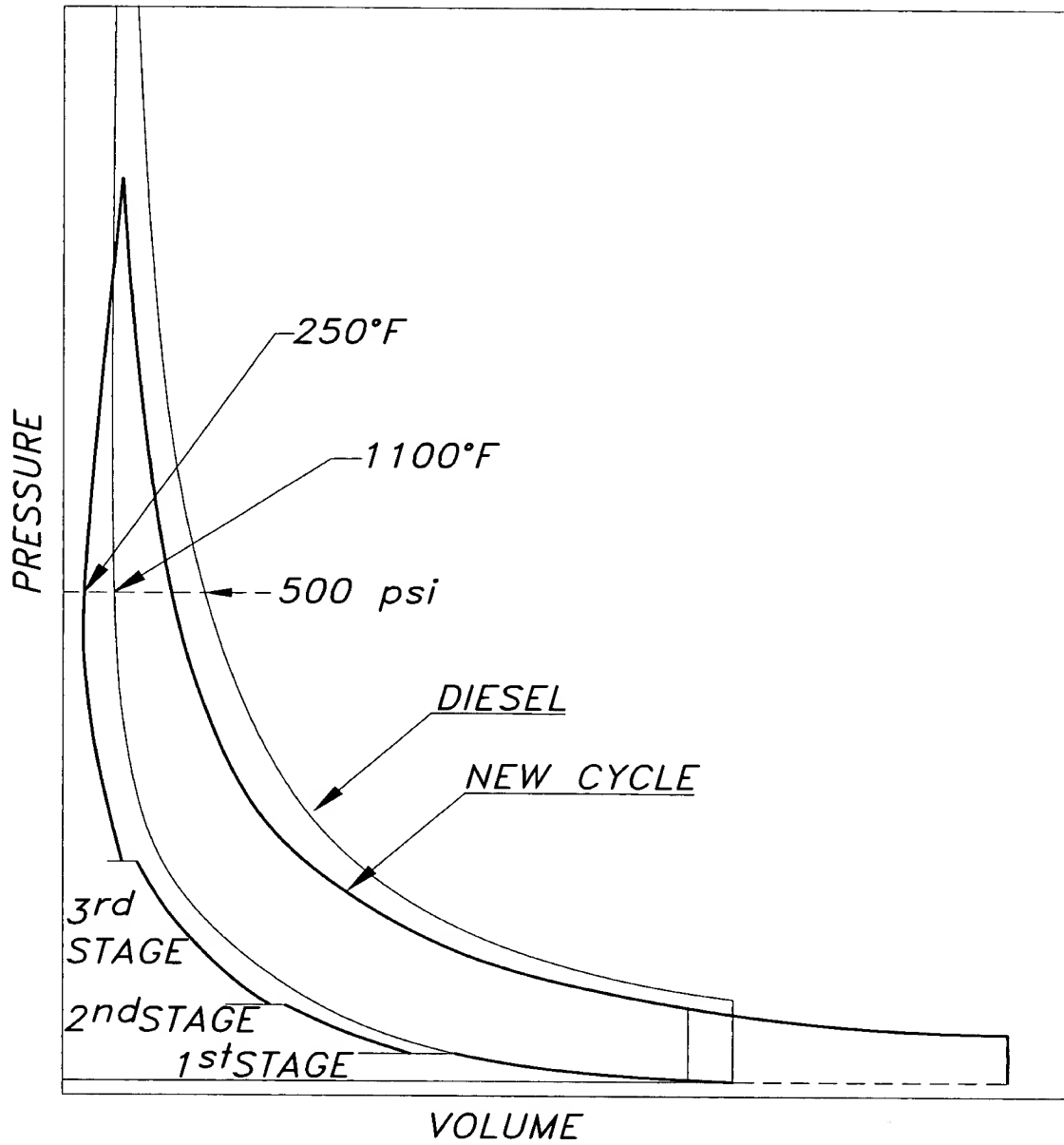
|                     |        |          |
|---------------------|--------|----------|
| APPROVED            | OG SIG |          |
| BY<br><br>DRAFTSMAN | CLASS  | SUBCLASS |
|                     |        |          |

|           |        |       |          |
|-----------|--------|-------|----------|
| APPROVED  | OG FIG | CLASS | SUBCLASS |
| BY        |        |       |          |
| DRAFTSMAN |        |       |          |



**FIG 11**

|          |       |           |
|----------|-------|-----------|
| APPROVED | BY    | DRAFTSMAN |
| 00       | FIG   |           |
| 00       | CLASS | SUBCLASS  |



**FIG 12**

|           |          |
|-----------|----------|
| APPROVED  | OG FIG   |
| BY        | CLASS    |
| DRAFTSMAN | SUBCLASS |

# COMPARISON OF OPERATING PARAMETERS OF A HEAVY DUTY TWO-STROKE DIESEL ENGINE (A)

WITH THE ENGINE OF THIS INVENTION (B)

| ENGINE | COMPRESSION RATIO OR NOMINAL COMPRESSION RATIO | EFFECTIVE COMP RATIO | COMPRESSION PRESSURE (PSI) | TEMP @ END COMP (DEG F.) | TEMP @ END COMB (DEG F.) | CHARGE DENSITY (LB./CU. FT.) | EXPANSION RATIO | E. R. C. R. | CHARGE WEIGHT PER REVOLUTION (GRAMS) |
|--------|--|----------------------|----------------------------|--------------------------|--------------------------|------------------------------|-----------------|-------------|--------------------------------------|
| A      | 19:1   | 19:1                 | 907                        | 1300                     | 3400                     | 1.45                         | *10:1           | 0.5         | 2.06                                 |
| B(ic)  | 13:1   | 2:1                  | 533                        | 250                      | 3000                     | 2.03                         | **19:1          | 1.5         | 2.86                                 |
| B(bp)  | 13:1   | 13:1                 | 533                        | 992                      | ^3100                    | 1.01                         | **19:1          | 1.5         | 1.43                                 |
| B2(ic) | 10:1   | 2:1                  | 369                        | 250                      | ^2800                    | 1.40                         | **19:1          | 1.9         | 1.98                                 |
| B2(bp) | 10:1   | 10:1                 | 369                        | 871                      | ^2900                    | 0.75                         | **19:1          | 1.9         | 1.06                                 |

\* Exhaust valve opens midstroke

\*\* Exhaust valve opens near BDC

(ic) Air charge intercooled except for last stage of compression

(bp) Intercoolers bypassed

^ Estimated

E. R. = EXPANSION RATIO  
C. R. = COMPRESSION RATIO

|           |         |          |
|-----------|---------|----------|
| APPROVED  | O G FIG |          |
| BY        | CLASS   | SUBCLASS |
| DRAFTSMAN |         |          |

26240-234430

# COMPARISON OF OPERATING PARAMETERS OF A HEAVY DUTY FOUR-STROKE DIESEL ENGINE (A)

WITH THE ENGINE OF THIS INVENTION (B)

| ENGINE | COMPRESSION RATIO OR NOMINAL COMPRESSION RATIO | EFFECTIVE COMP RATIO | COMPRESSION PRESSURE (PSI) | TEMP @ END COMP (DEG F.) | TEMP @ END COMB (DEG F.) | CHARGE DENSITY (LB./CU. FT.) | EXPANSION RATIO | E. R. C. R. | CHARGE WEIGHT PER REVOLUTION (GRAMS) |
|--------|--|----------------------|----------------------------|--------------------------|--------------------------|------------------------------|-----------------|-------------|--------------------------------------|
| A      | 19:1   | 19:1                 | 907                        | 1300                     | 3400                     | 1.45                         | 19:1            | 1.0         | *1.03                                |
| B(ic)  | 13:1   | 2:1                  | 533                        | 250                      | 3000                     | 2.03                         | 19:1            | 1.5         | **2.86                               |
| B(bp)  | 13:1   | 13:1                 | 533                        | 992                      | ^3100                    | 1.01                         | 19:1            | 1.5         | **1.43                               |
| B2(ic) | 10:1   | 2:1                  | 369                        | 250                      | ^2800                    | 1.40                         | 19:1            | 1.9         | **1.98                               |
| B2(bp) | 10:1   | 10:1                 | 369                        | 871                      | ^2900                    | 0.75                         | 19:1            | 1.9         | **1.06                               |

- \* Per revolution, not per firing stroke
- \*\* Per revolution and per firing stroke
- (ic) Air charge intercooled except for last stage of compression
- (bp) Intrecoolers bypassed
- ^ Estimated

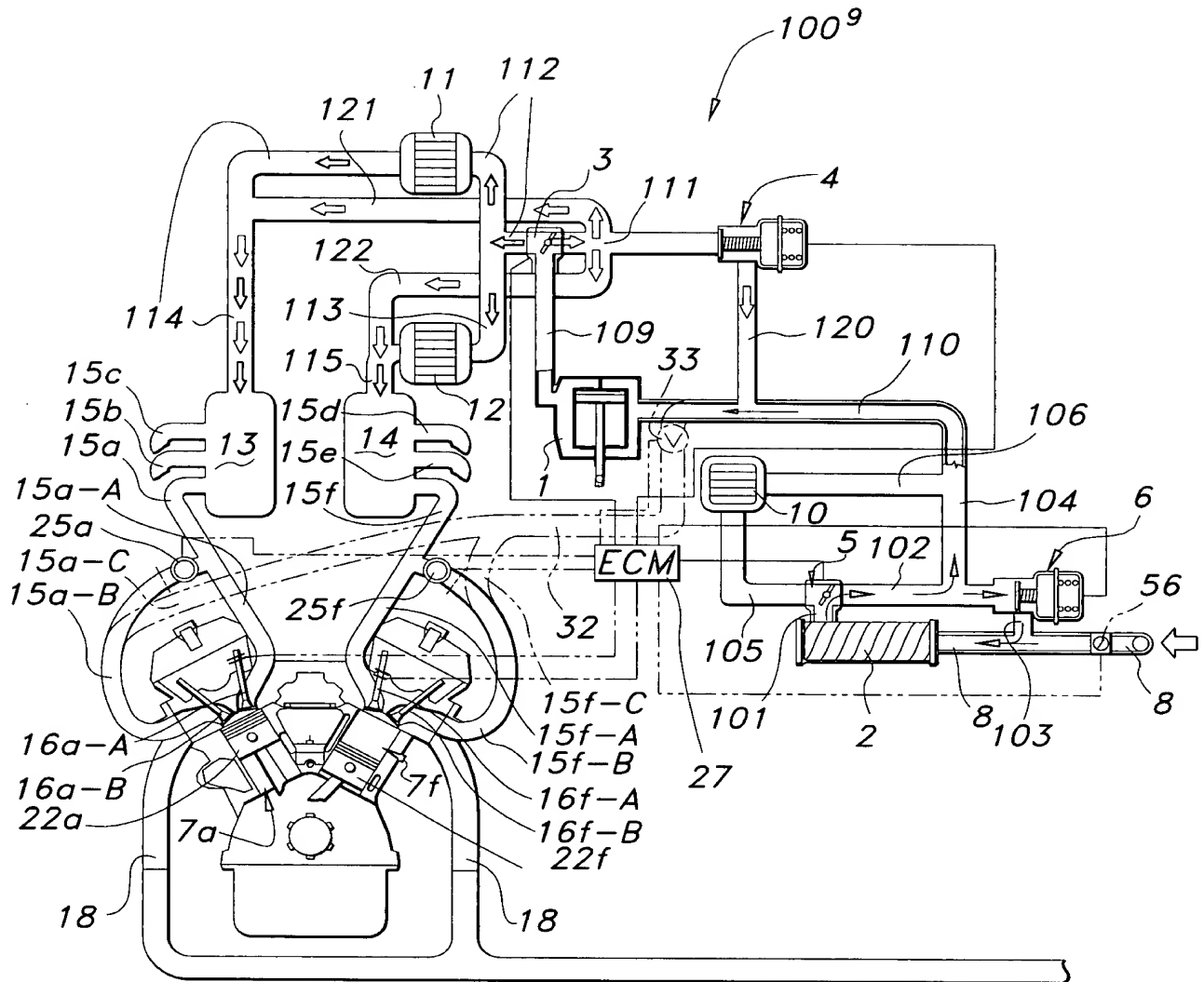
$$\frac{\text{E. R.}}{\text{C. R.}} = \frac{\text{EXPANSION RATIO}}{\text{COMPRESSION RATIO}}$$

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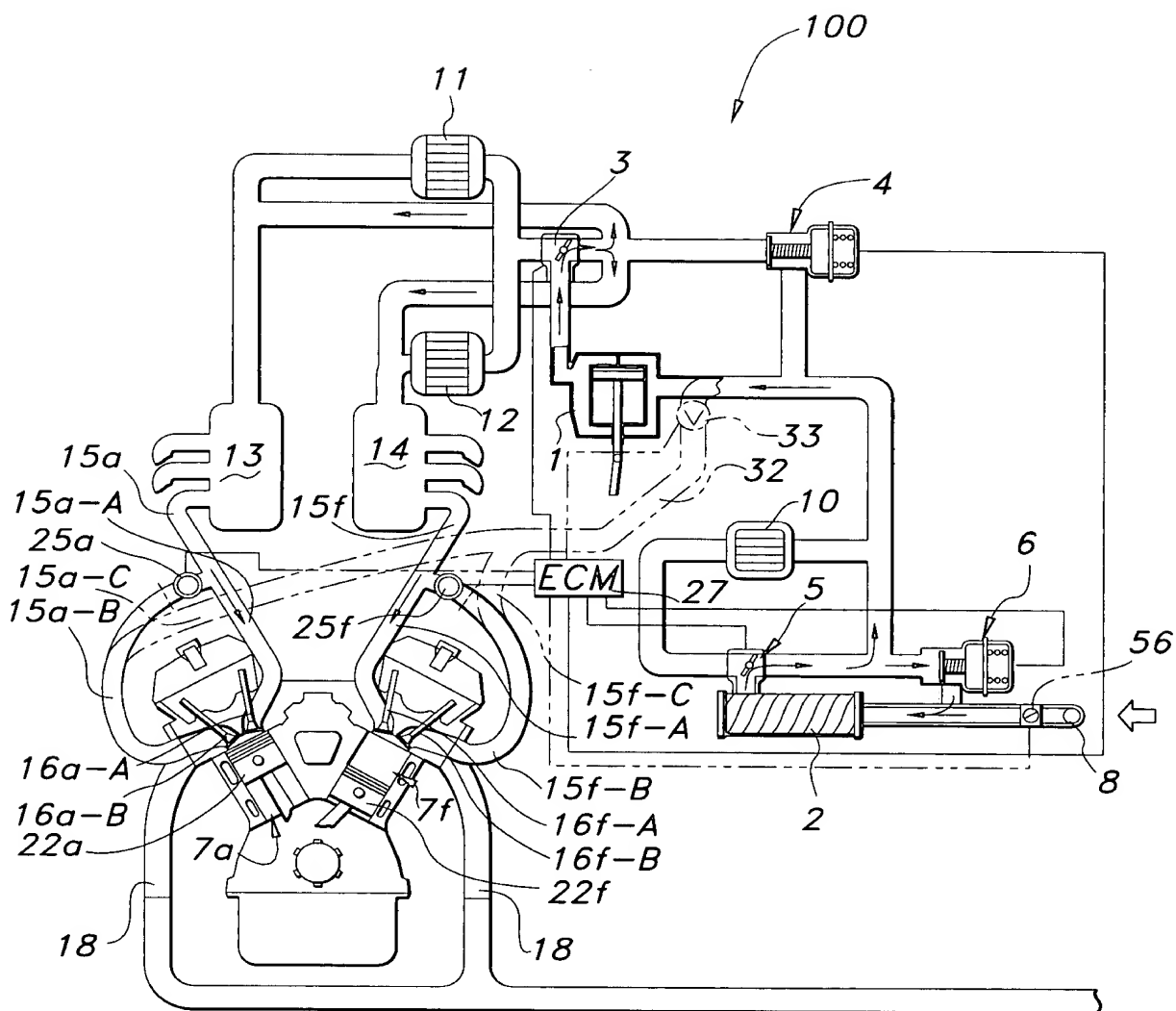
FIG-14



|          |       |           |
|----------|-------|-----------|
| APPROVED | BY    | DRAFTSMAN |
| CLASS    | CLASS | SUBCLASS  |
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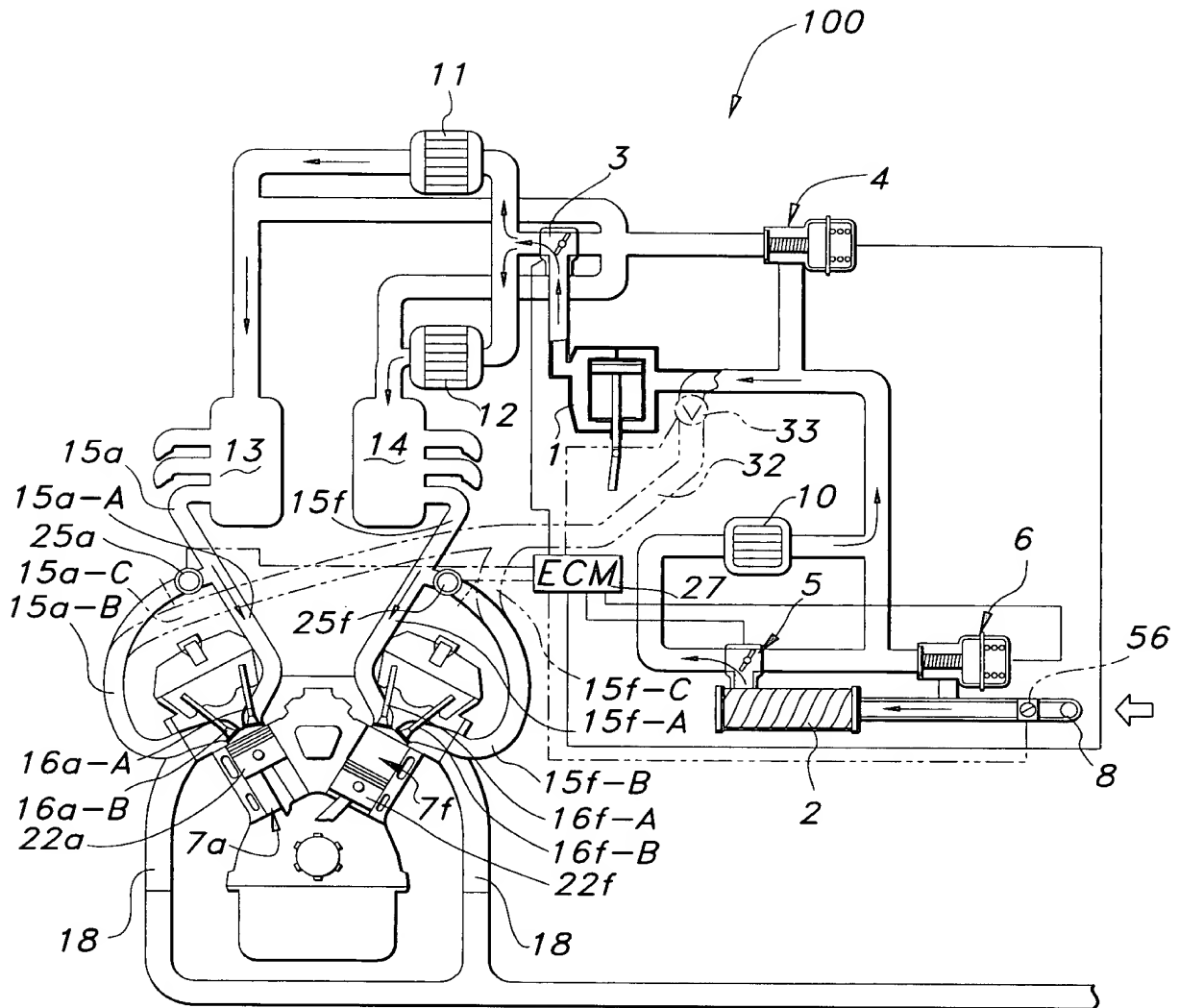
**FIG 15**

APPROVED BY DRAFTSMAN  
 CLASS SUBCLASS  
 CIG

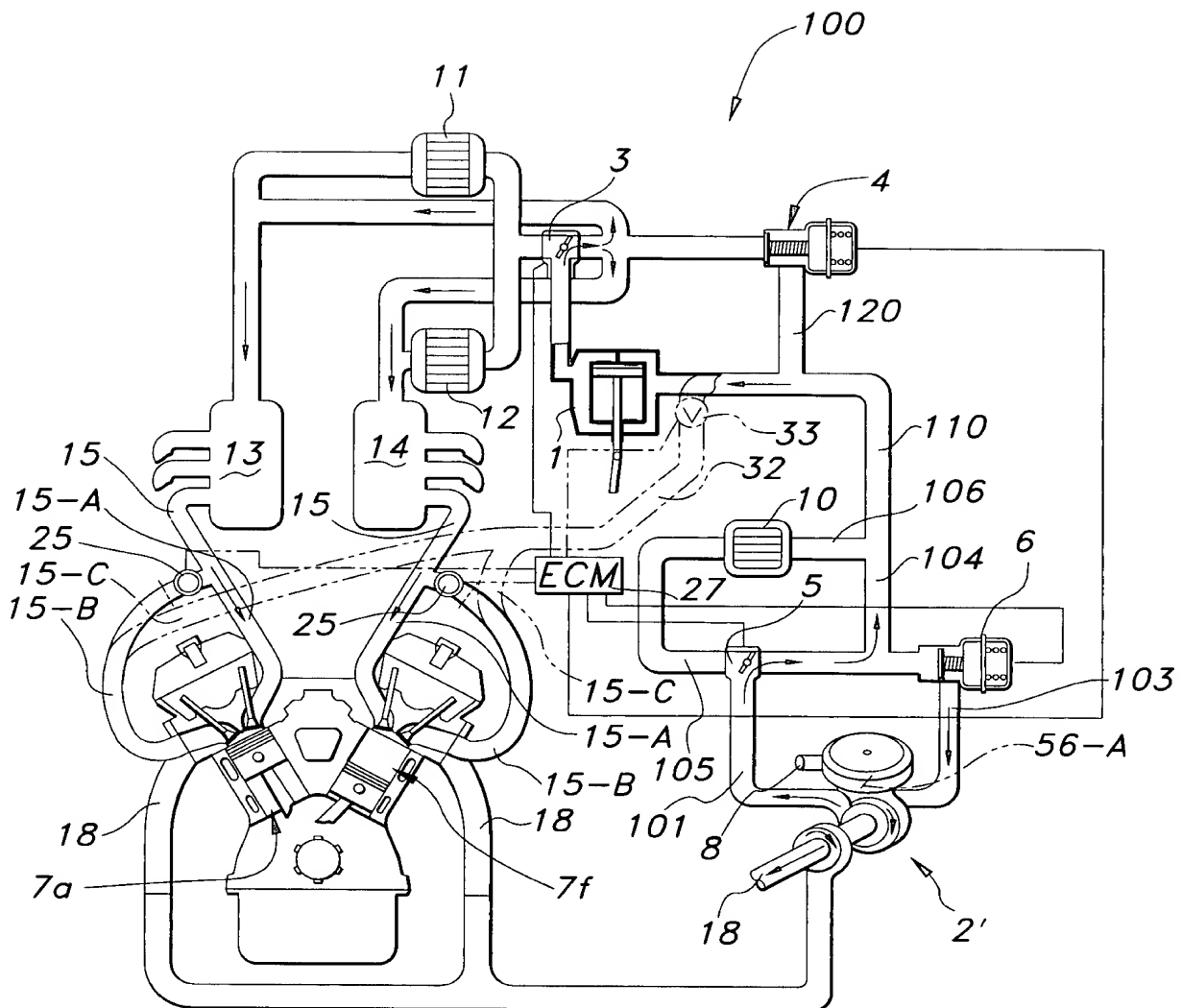


**FIG 16**

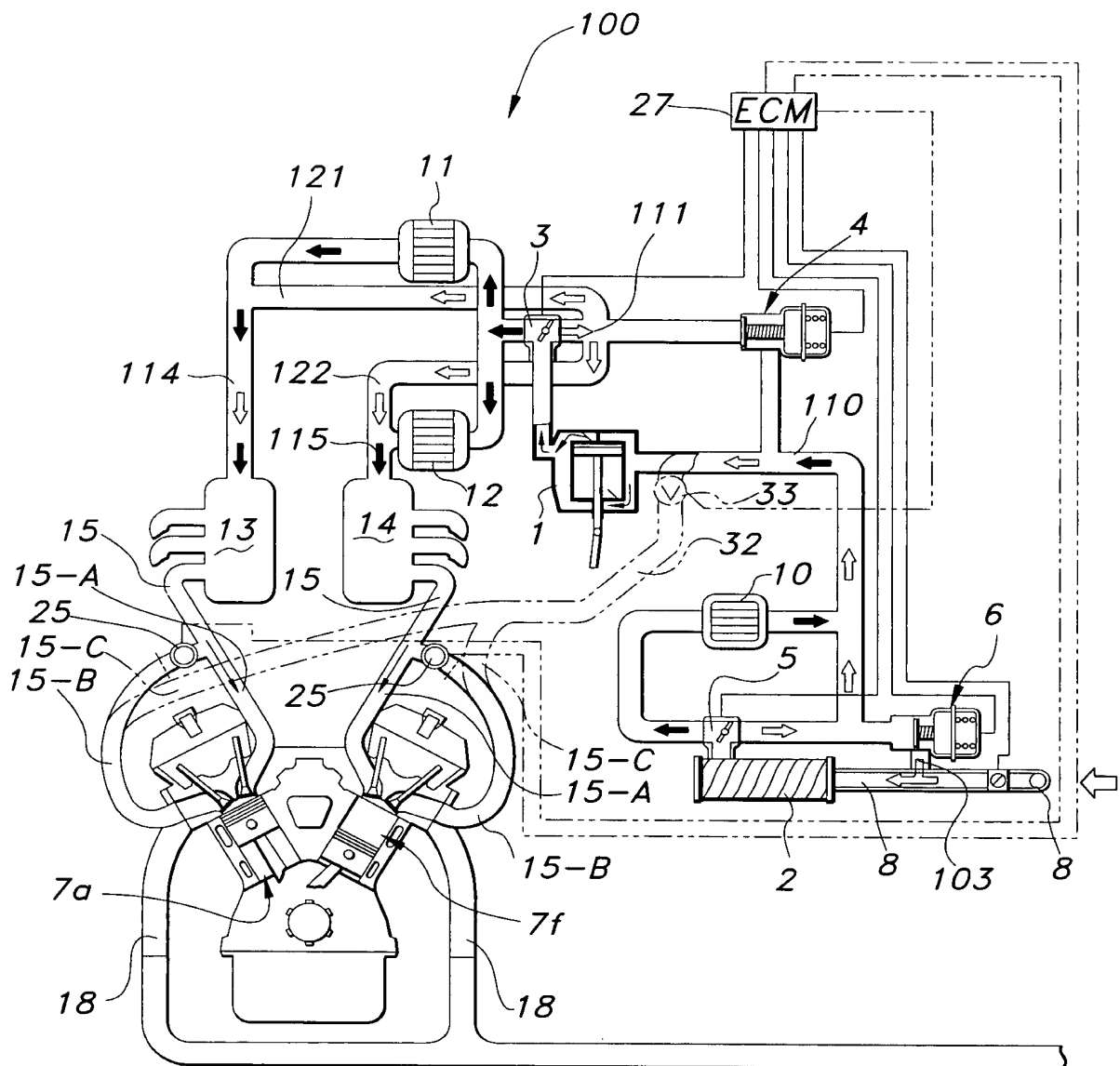
|           |       |          |
|-----------|-------|----------|
| APPROVED  | CC    | FIG      |
| BY        | CLASS | SUBCLASS |
| DRAFTSMAN |       |          |

**FIG 17**

|           |                |
|-----------|----------------|
| APPROVED  | O.G. FIG       |
| BY        | CLASS SUBCLASS |
| DRAFTSMAN |                |

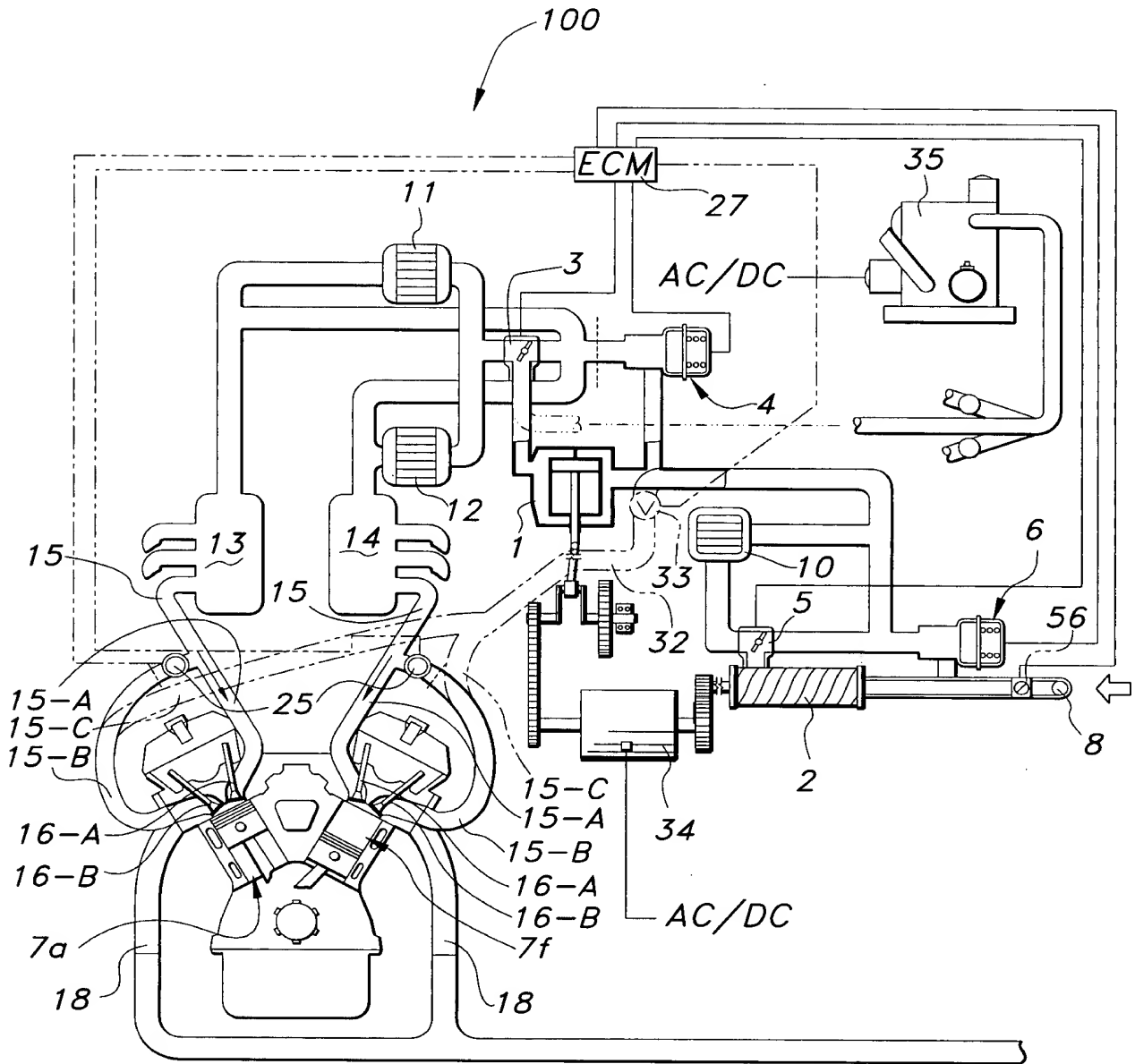
**FIG 18**

|          |       |           |
|----------|-------|-----------|
| APPROVED | BY    | DRAFTSMAN |
| CLASS    | CLASS | SUBCLASS  |

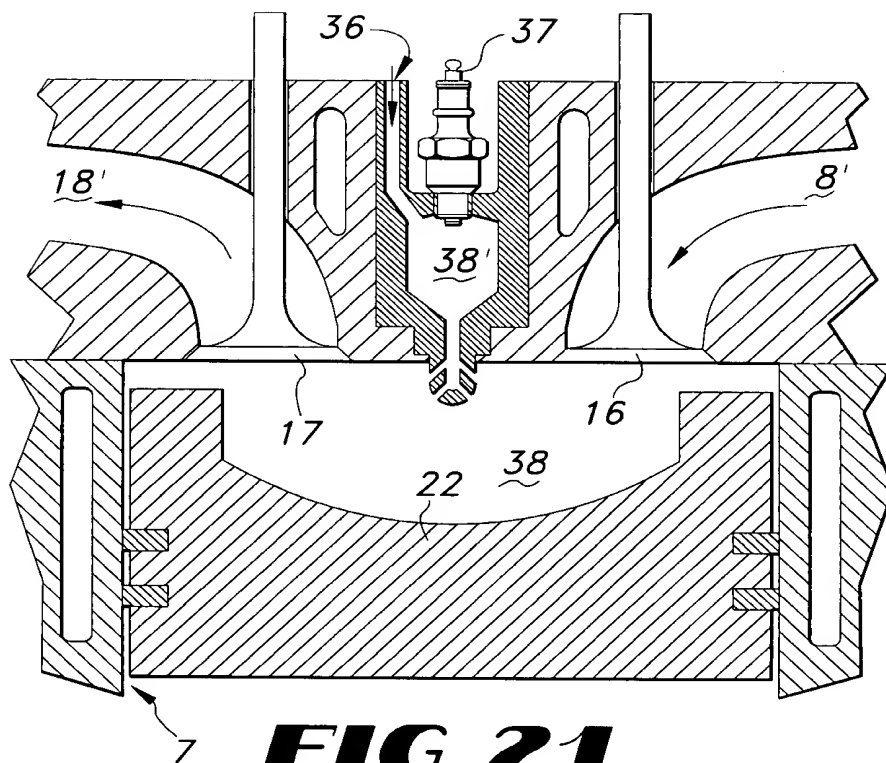
**FIG 19**

| APPROVED  | O.G. FIG | CLASS | SUBCLASS |
|-----------|----------|-------|----------|
| BY        |          |       |          |
| DRAFTSMAN |          |       |          |

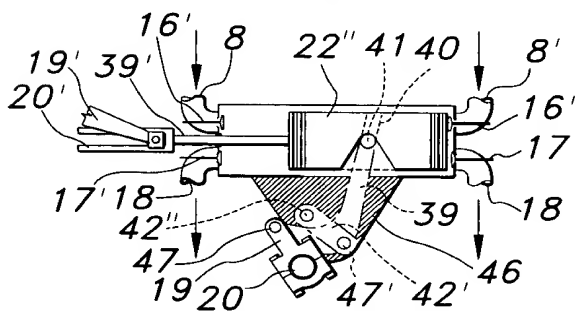
APPROVED BY DRAFTSMAN



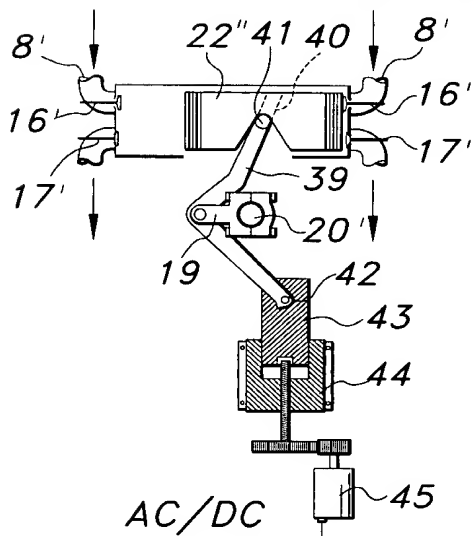
**FIG 20**



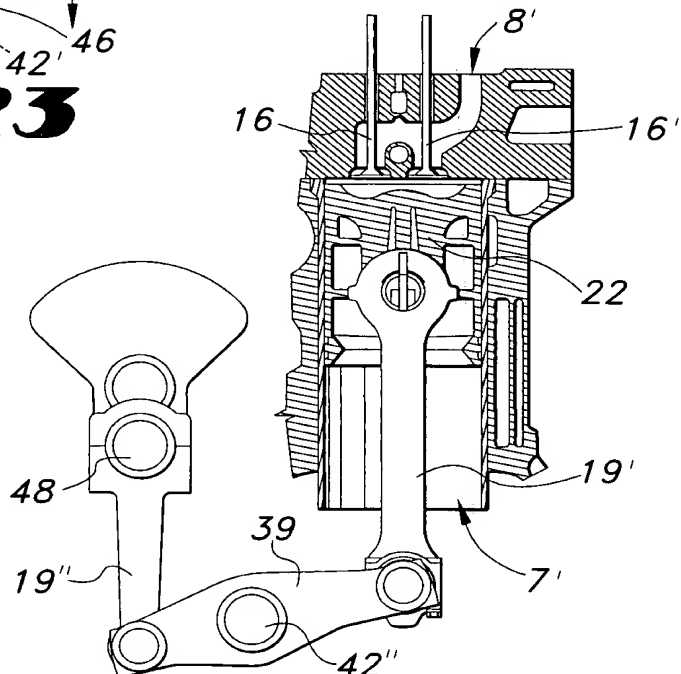
**FIG 21**



**FIG 23**



**FIG 22**

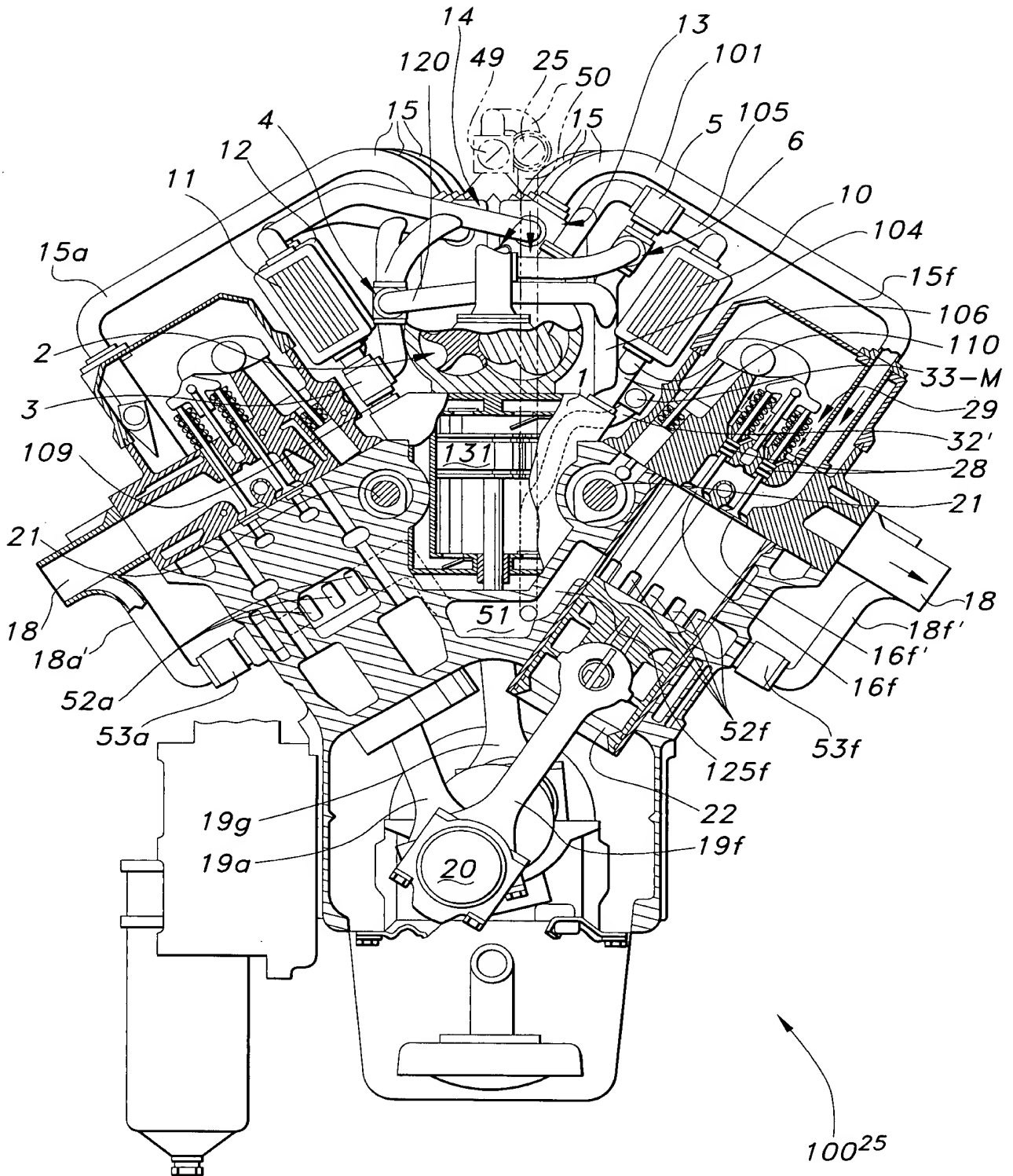


**FIG 24**

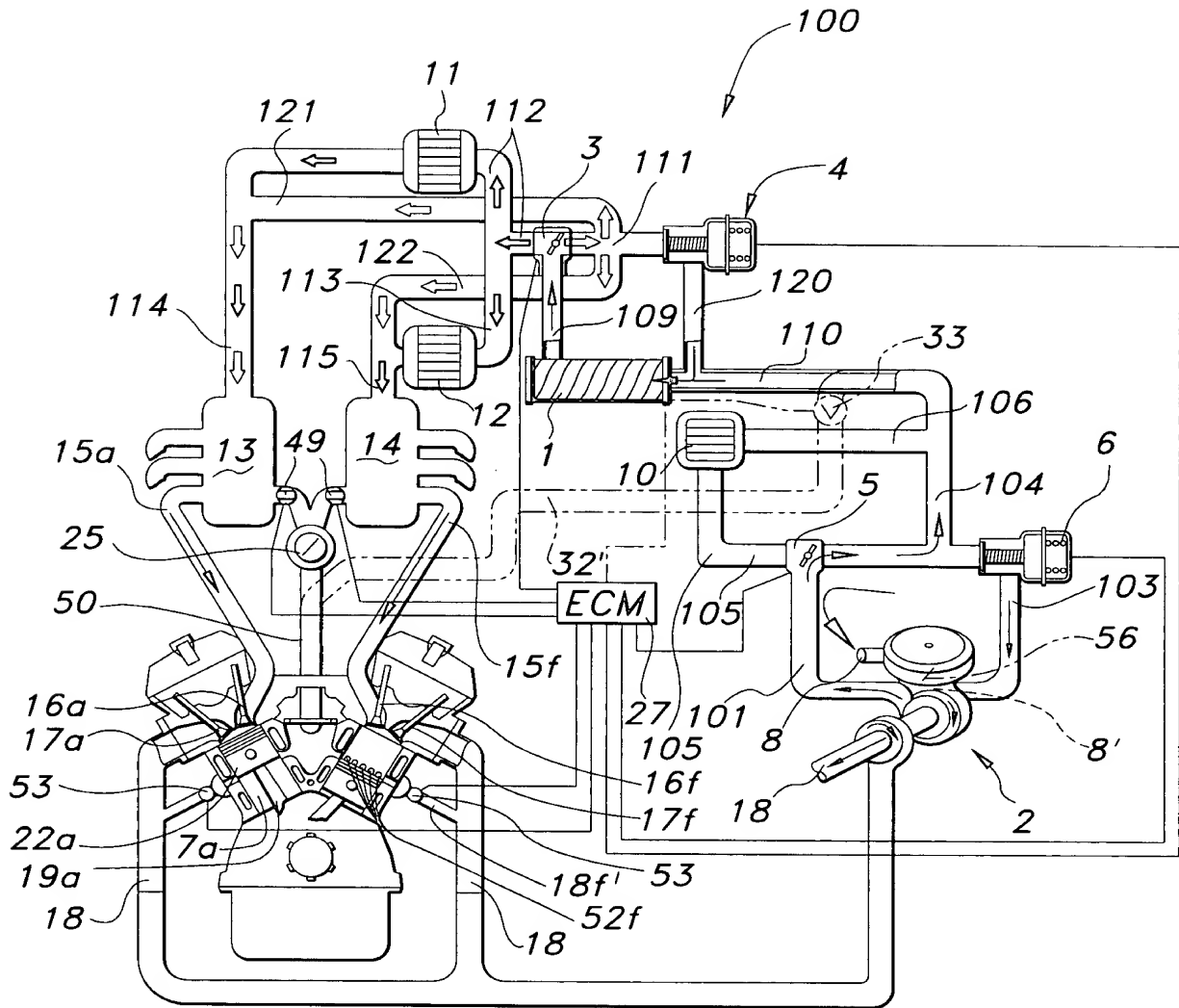
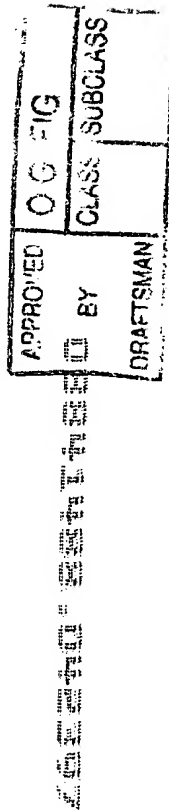
|          |       |           |
|----------|-------|-----------|
| APPROVED | BY    | DRAFTSMAN |
| OG FIG   | CLASS | SUBCLASS  |

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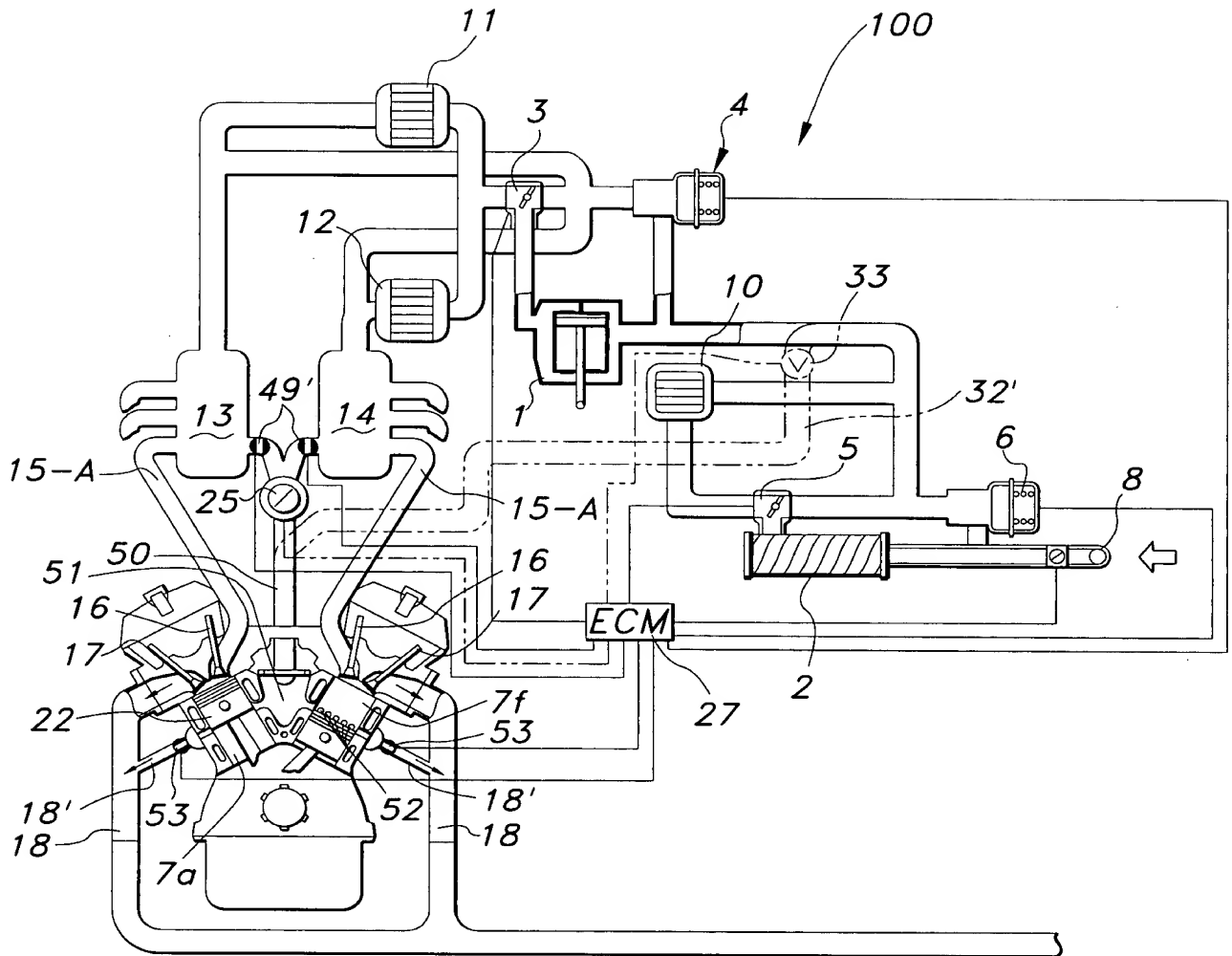
|          |          |           |
|----------|----------|-----------|
| APPROVED | BY       | DRAFTSMAN |
| CLASS    | SUBCLASS |           |

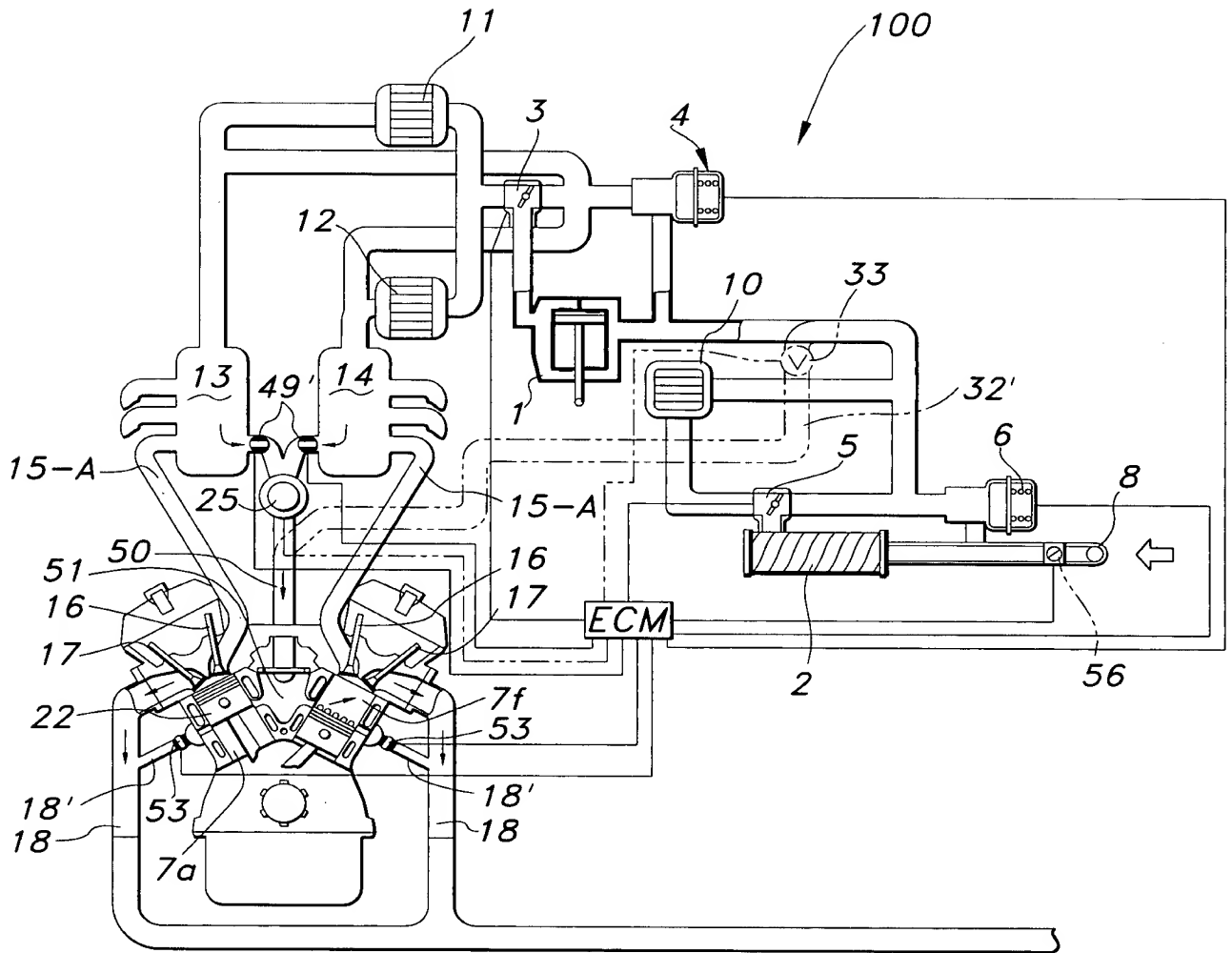
**FIG 25**



**FIG 26**

|          |          |           |
|----------|----------|-----------|
| APPROVED | BY       | DRAFTSMAN |
| 00       | FIG      |           |
| CLASS    | SUBCLASS |           |

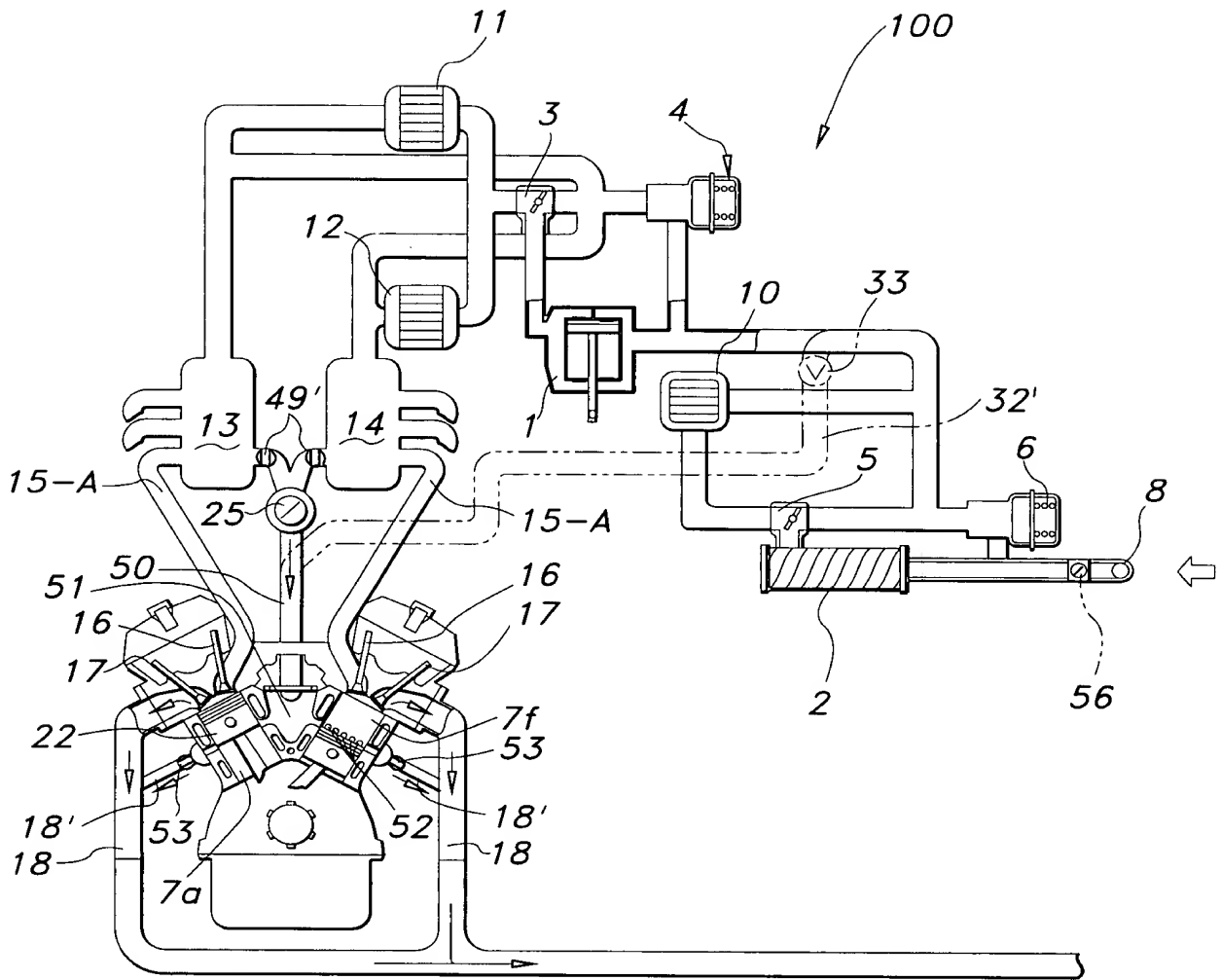
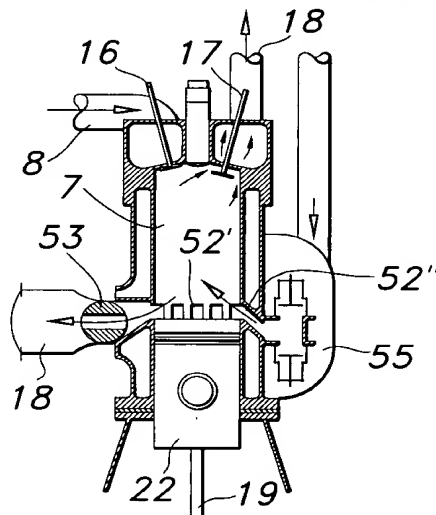
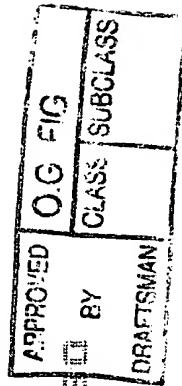
**FIG 27**



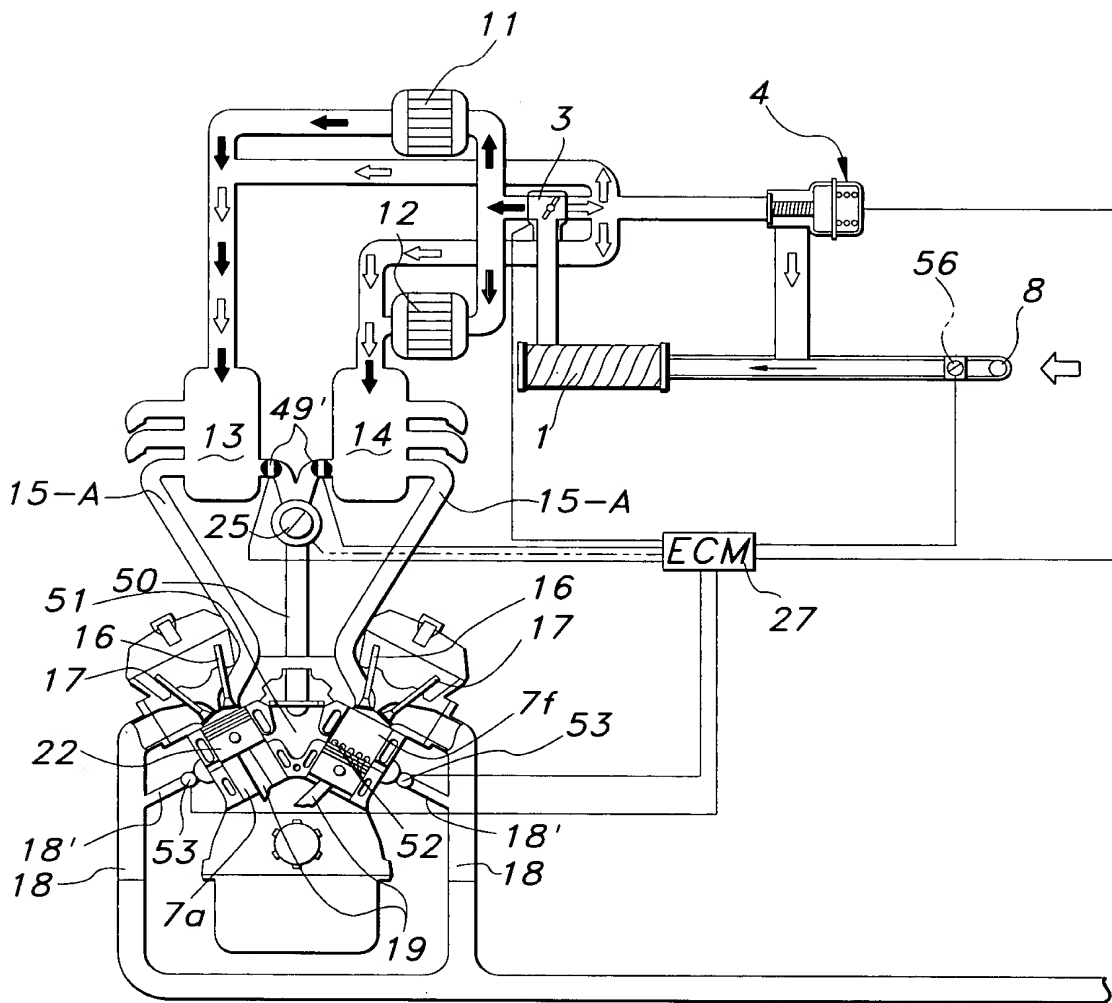
**FIG 28**

|          |       |           |
|----------|-------|-----------|
| APPROVED | BY    | DRAFTSMAN |
| O.C. FIG | CLASS | SUBCLASS  |

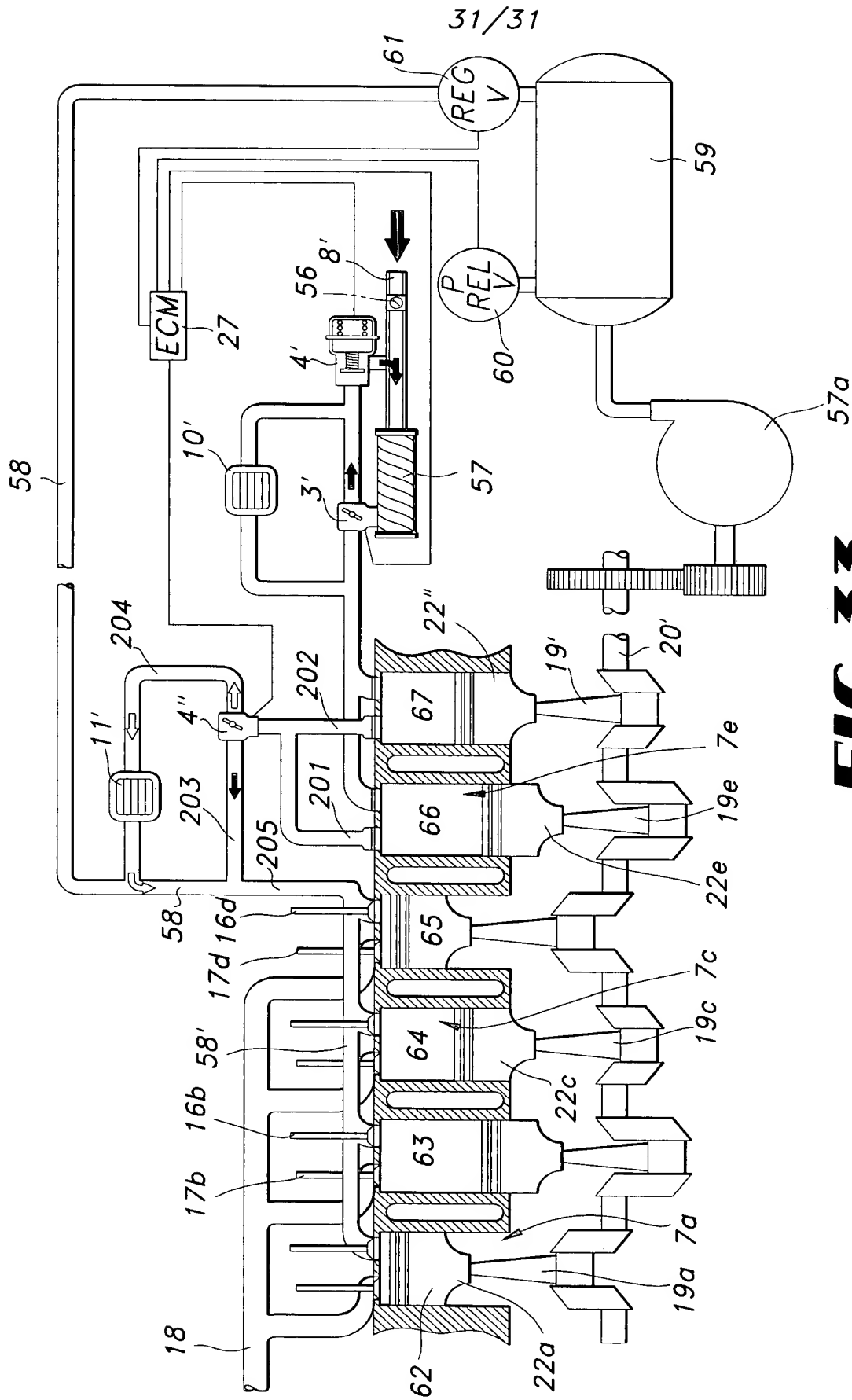
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**FIG 29****FIG 30**



**FIG 32**

|           |          |
|-----------|----------|
| APPROVED  | O.G. FIG |
| BY        | CLASS    |
| DRAFTSMAN | SUBCLASS |



**FIG 33**